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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/632,379	08/01/2003	Fu-Liang Yang	67,200-377	4157

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EXAMINER

FARAHANI, DANA

ART UNIT	PAPER NUMBER
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2891

DATE MAILED: 03/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/632,379

Applicant(s)

YANG, FU-LIANG

Examiner

Dana Farahani

Art Unit

2891

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 04 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 8/1/03.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-3, 6-10, 13-15 and 18 recite the limitation "said corrugated surface". There is insufficient antecedent basis for this limitation in those claims.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 2, 4-6, 8, 9, and 11-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Hayashi et al., hereinafter Hayashi (US Patent 5,365,078), newly cited.

Regarding claims 1, 4-6, 8, and 11-13, Hayashi discloses in figure 3, a field effect transistor (FET) device comprising a gate electrode 26 formed over the substrate 21 and channel 22; and a pair of source/drain regions. An interface 23 of the channel region 22 covered by the gate electrode or/and an upper surface of the gate electrode is corrugated with rounded valley bottom portions, as can be seen in the figure.

Regarding claims 2 and 9, the (FET) device is selected from the group consisting of metal oxide semiconductor field effect transistor (MOSFET) devices and metal semiconductor field effect transistor (MESFET) devices.

*Claim Rejections - 35 USC § 103*

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 3, 7, 10, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hayashi.

Hayashi substantially discloses the claimed invention, as discussed above, except for the longitude peak and the depth of the curved channel region. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to adjust the height of the bumps on the gate electrode to make the transistor with suitable sizes for various applications. See *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990) for the proposition that that when the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising therefrom, the Applicant must show that the chosen dimensions are critical.

7. Claims 15-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Semple et al., hereinafter Semple (US Patent 6,677,202) in view of Hayashi.

Semple discloses in figure 2A, a silicon substrate 101;  
a gate electrode 207; and  
a pair of source and drain regions 104 separated by the channel region, wherein an interface of the channel region covered by the gate electrode is corrugated.

Semple does not disclose the corrugation has rounded valley bottom portions.

Hayashi discloses this limitation, as discussed above. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the bottom portions of the corrugated interface of the structure of the Semple reference rounded to further increase the area of the channel.

### *Response to Arguments*

8. Applicant's arguments with respect to the previously rejected claims have been considered but are moot in view of the new ground(s) of rejection.

### *Conclusion*

9. The prior art cited but not relied upon in the rejections, is considered pertinent to applicant's disclosure.

See Divincenzo et al. (US Patent 5,023,671), for showing that making rounded bottom corrugations is feasible in a silicon contained semiconductor surface (see fig. 8, and the description in column 6, lines 45-55).

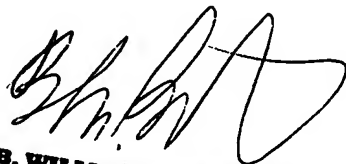
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dana Farahani whose telephone number is (571)272-1706. The examiner can normally be reached on M-F 9:00AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Baumeister can be reached on (571)272-1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2891

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

D. Farahani



**B. WILLIAM BAUMEISTER**  
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